Exercise 1 *When studying trigonometry, you will learn that both* sin *and* cos *are periodic functions with period* 2π.

Many functions that can be built out of sin *and* cos *are also periodic. In this exercise, we'll use Desmos to explore how the period can change.*

(a) *Consider the function f defined by $f(x) = \sin(3x)$. For reference, here is a graph of f on Desmos:*

Desmos link: https://www.desmos.com/calculator/uc3meehtpv

The period of f is

Multiple Choice:

(i) π.
(ii) 2π.
(iii) 3π.
(iv) 6π.
(v) $\frac{\pi}{2}$.
(vi) $\frac{2\pi}{3}$. ✓

(b) *Consider the function g defined by $g(x) = \cos\left(\frac{x}{3}\right)$. For reference, here is a graph of g on Desmos:*

Desmos link: https://www.desmos.com/calculator/364oqkoauu

The period of g is

Multiple Choice:

(i) π.
(ii) 2π.
(iii) 3π.
(iv) 6π. ✓
(v) $\frac{\pi}{2}$.
(vi) $\frac{2\pi}{3}$.

(c) *Consider the function h defined by $h(x) = \sin(2x - \pi)$. For reference, here is a graph of h on Desmos:*

Desmos link: https://www.desmos.com/calculator/wha8ccbi93

The period of h is

Multiple Choice:

(i) π. ✓

(ii) 2π.

(iii) 3π.

(iv) 6π.

(v) $\frac{\pi}{2}$.

(vi) $\frac{2\pi}{3}$.